Schmieding, Janice

From: Wessinger-Hill, JoAnne
Sent: Tuesday, May 4, 2021 10:52 AM
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Cc: PSC_Attorneys
Subject: RE: Courtesy Copy of Cross Examination Exhibit -- DN 2019-224-E/DN 2019-225-E
Attachments: DEC DEP Lucas Cross Exhibit 4.PDF

Dear Parties of Record:

On behalf of the Court Reporter, attached is a copy of the cross examination exhibit currently being used by counsel.

Please know it is requested that counsel identify the exhibit by number or document by name prior to use so that it can be distributed.

Jo Anne

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filed by you in the DMS for this matter. **If the reader of this message does not want certain information, which is meant to be discussed only between the parties and not Public Service Commission of South Carolina (Commission) staff, please do not use "reply all" to this message. Any e-mail message involving the Commission or Commission staff** is also subject to the provisions of Commission Order No. 2019-748 in Docket No. 2019-329-A; shall be published in the docket for this matter; and **should also be copied to all parties of record in the docket.** If you have received this communication in error, please immediately notify us by telephone at (803) 896-5100.

DUKE ENERGY CAROLINAS, LLC AND DUKE ENERGY PROGRESS, LLC (DEP)

Request:

[DEC only] Page 287 states in part, "Consistent with recent trends, total annual solar and solar coupled with storage interconnections were limited to 300 MW per year over the planning horizon in DEC."

a. Please provide a summary of the total amount of solar (third party and utility-owned) interconnected in each year for the past five years.

b. Please explain the factors that limit interconnection of solar capacity for DEC.

Response:

a. Please see attached file "PSDR 17-10_DEC Solar Interconnect.xls" for a summary of historic solar interconnections in DEC and DEP.

b. From the time a solar facility enters the transmission or distribution queue to when the facility is connected and given permission to put power to the grid, there are several areas where constraints can occur in the process. First, regardless of the generator's capacity, facilities have historically been studied to determine if any transmission system or network upgrades are required in the order that they entered the queue. Completing a study can take months or years depending on the type of interconnection request (FERC vs State projects) and the number of projects already in the queue to be processed at the time of the request. The study must then be accepted by the requesting facility which can also add further delays. Because the studies are conducted in sequential order, in some instances, the transmission planners must evaluate the interdependency of one project on the next project in the queue. For State requests, until the first study is complete and accepted by the requesting facility, the interdependency of that project on the next project cannot be studied. For FERC requests, the studies move forward, but Contingent upgrades can remain an open uncertainty for years. Once the studies are finally completed and accepted, the construction work must be planned. Planning to interconnect any facility to the transmission system is complex. Scheduling new interconnection work is dependent on other work taking place on the transmission system (i.e., customer connections, maintenance, other interconnection construction and general transmission projects), generator outages which can change power flows on the system, and projected energy demand on the system. Generally, over the course of the year there are only about 24 weeks (shoulder months) where transmission outages take place. In some instances, temporary transmission lines can be constructed to allow for extended project work, but that adds cost to the projects. When the projects are planned, Duke must communicate the upcoming construction plans to the communities around the construction sites and establish the resources (both the people and the materials) to construct the projects. Some equipment has long lead times, but to date finding skilled labor has not been a major limiting factor to interconnecting solar. However, Duke project planners compete with other utilities in the region for resources. To the extent states, such as Virginia, progress on their paths towards a zero carbon future, there will be increased competition for resources as Duke and NC embark on similar efforts. Finally, once the projects are connected to the system, the facilities must be granted permission to operate by the ECC. Testing and commissioning of the newly interconnected facility can take additional time, particularly if issues arise that cause a delay in the utility issuing the permission to operate.

It is also important to note that over the last 5 to 6 years, many of the projects that have interconnected have been small (<5 MW) projects on the distribution system. These projects, while low in capacity, can still be complex projects that can have impacts on the transmission system that require complex solutions. The efficiency of interconnecting these smaller projects is low (i.e., high effort for low MW). As is occurring presently, the economies of scale of larger projects are leading to larger projects entering the queue, which in theory should improve the efficiency of the interconnection process.

Additionally, the recently developed queue reform process that will allow for "cluster studies" of groups of projects should improve the efficiency of transmission impact studies by eliminating the sequential method that projects are currently studied under and spreading the costs of larger upgrades across projects. However, that will not change the fact that larger projects can lead to more complex interconnection solutions on the system with more network upgrades required; and, as smaller projects have been sited closer to existing transmission infrastructure, future projects will be sited further from that infrastructure, potentially requiring more time consuming right-of-way acquisition and more complex projects just to reach the existing transmission infrastructure.

While the above represents physical constraints, the Company did not include certain economic constraints such as an escalating SISC charge on increasing penetrations of solar or solar + storage, nor did the Company include any system upgrade costs for interconnecting increasing levels of solar or solar + storage as penalties in the capacity expansion planning process. Finally, while not an issue through 2030, the same resources that are required for interconnecting this solar generation will also be needed for interconnecting up to 300 MW/year of onshore Carolinas wind between DEC and DEP in the later portion of the planning horizon.

In summary, certain real-world physical constraints and economic constraints such as increasing ancillary service costs and project specific system upgrade costs are difficult to precisely model in an IRP modelling framework. As such, reasonable estimates of such constraints were applied in the IRP base case.

Person responding: Matt Kalemba, Director, DET Planning & Forecasting

Universal Solar Connections - Including Utility Owned	2014	2015	2016	2017	2018	2019
Counts						
DEC Transmission	0	1	2	2	1	0
DEC Distribution	32	51	39	16	10	12
Total DEC Connections	32	52	41	18	11	12
DEP Transmission	9	9	6	23	8	4
DEP Distribution	51	84	51	41	57	40
Total DEP Connections	60	93	57	64	65	44
Capacity						
DEC Transmission	0	18	90	79	75	0
DEC Distribution	64	132	100	32	25	29
Total DEC Capacity	64	150	190	112	100	29
DEP Transmission	43	167	170	470	248	78
DEP Distribution	198	401	210	163	208	160
Total DEP Capacity	241	569	380	633	456	238

Universal Solar Connections - Third Party Only	2014	2015	2016	2017	2018	2019
Counts						
DEC Transmission	0	1	1	1	1	0
DEC Distribution	32	51	39	16	10	11
Total DEC Connections	32	52	40	17	11	11
DEP Transmission	9	6	5	23	8	4
DEP Distribution	51	84	51	41	57	40
Total DEP Connections	60	90	56	64	65	44
Capacity						
DEC Transmission	0	18	75	19	75	0
DEC Distribution	64	132	100	32	25	23
Total DEC Capacity	64	150	175	52	100	23
DEP Transmission	43	67	130	470	248	78
DEP Distribution	198	401	210	163	208	160
Total DEP Capacity	241	468	340	633	456	238